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USEFUL RECEIPTS.

Starch from Horse Chestnut and Arrow Root.

Hedenus and Flaudin have proposed the production of starch from horse chestnut, which amongst other amylaceous and albuminous substances is said to contain 25 per cent. of this substance. The bitter principle in the chestnut can be removed by alkali, and the following process is said to afford a product, which cannot be chemically distinguished from starch obtained from other sources. The chesnuts are thrown into boiling water, skinned and grated; the grated mass is then well mixed and kneaded with soda (1 lb. to 100 lbs. of the pulp,) and the starch subsequently obtained from it by washing in the ordinary manner. Water alone is said to remove the bitter principle, but a sharp taste then remains attached to the starch, which can only be removed by alkali.

The snow-white powder known as arrow-root, and at one time most erroneously considered the very essence of nutrition, and particularly recommended as food for infants, is a very pure kind of starch prepared in the West Indies, particularly in Jamaica, from the root of the "Marantha arundinacea" and "Indica," plants belonging to the family of the "Scitamineæ." The name was first applied to the root from its supposed efficacy in curing wounds. The starch is contained in the joints of the rhizome, or underground stem, being deposited in a number of very minute cells.

The following account of the mode of preparing this arrow-root is given by Pereira:—

"The starch or fecula is extracted from the roots (tubers) when these are about ten or twelve months old. The process is entirely a mechanical one, and is performed either by hand or machine."

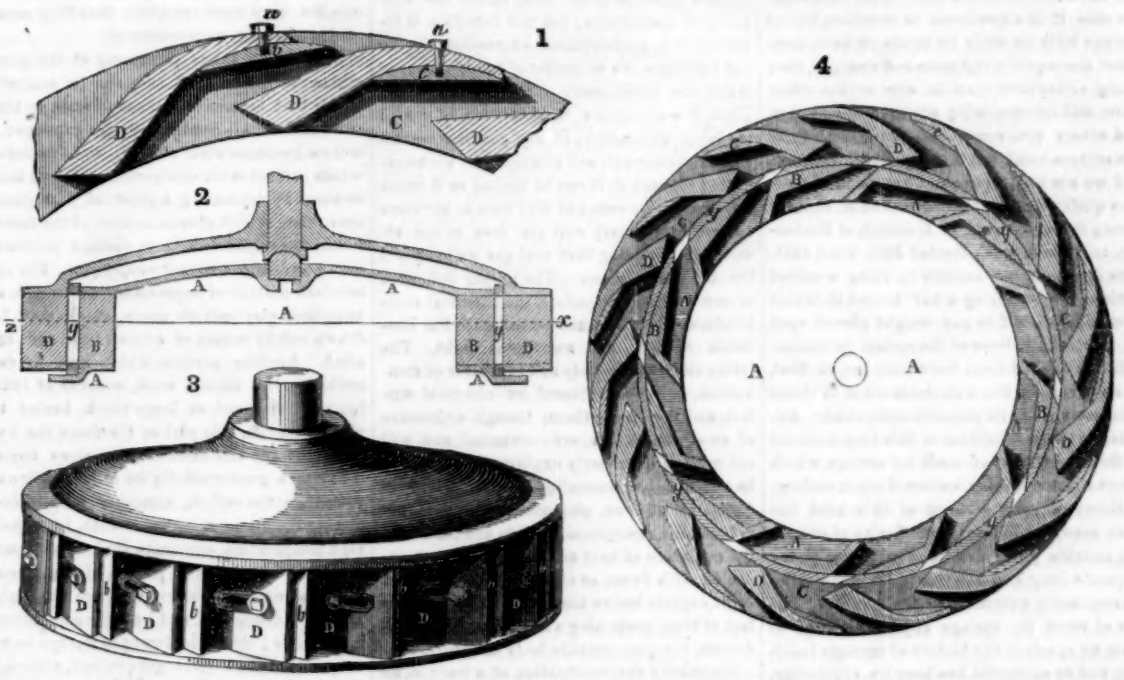
In Jamaica it is procured as follows:—The tubers are dug up, well washed with water, and then beaten in large deep wooden mortars to a pulp. This is thrown into a large tub of clean water. The whole is then well stirred, and the fibrous part then wrung out by the hands and thrown away. The milky liquor being passed through a hair sieve or coarse cloth, is suffered to settle, and the clear water is drained off. At the bottom of the vessel is a white mass, which is again mixed with clean water and drained; lastly, the mass is dried on sheets in the sun, and is pure starch.

In Bermuda the roots are first deprived of their paper-like scales, and then rasped by a kind of wheel rasp, and the fecula well washed through sieves and carefully dried.

Bleeding from the Nose.

To prevent the above there are several methods, viz., applying alcohol steeped in lint, which is a most energetic styptic, or by inserting carded cotton wool rolled up, which should be put into the nostril until it is well filled. It must not, however, be too tightly rolled, or the blood cannot penetrate the interstices, nor too loosely, or it will do so too easily, and the hemorrhage will continue.

JAGGER'S PATENT TURBINE WHEEL.



The annexed engravings are views of an improvement in the French turbine water wheel, invented by Ira Jagger, of the city of Albany, N. Y., and for which a patent was granted on the 19th of last October (1852.) Figure 1 is an enlarged view of a part of the periphery of the wheel with some buckets; figure 2 is a profile section through the centre; figure 3 is a perspective view of the wheel as set in its proper position, and figure 4 is a plan or horizontal section taken through *x y*.—A being the fixed part or shute chamber, with the shutes, B B, and C the wheel with its adjustable buckets, the same letters refer to like parts. The improvement consists in a sliding gauge or lip secured to the extremity of each bucket, as shown at *a b c*, in the figures, for the extension of the bucket, and fitted to the concave surface of the interior of it, by means of which the orifice of discharge, and its direction is regulated according to the head, under which the wheel works, and the amount of work to be done, and thus obtain the maximum effect with every varying head of water, also adapting the wheel to the work to be done, which in many cases varies a great deal. The lip is a rectangular plate of iron reaching from the top to the bottom of the bucket; its back surface next the bucket is curved so as to fit the curved surface of the bucket, its front surface being flat, and a chord to the curve of the back surface. This lip is secured in its place by a screw bolt, *a*, sliding through a slot in the bucket, and tapped into a lip and is regulated by sliding the said lip to or from the bucket directly in front of it, so as to diminish or increase the space between it and that bucket as shown in figures 1 and 3, where the lip, *b* is shown as nearly closing the exit passage, and the lip, *c*, as leaving the space between the buckets entirely open. A gate is placed between the shute chamber and the wheel, by which to regulate the supply of water to the wheel, so that there may be a due proportion between the quantity of water pressing into the wheel and that flowing out. There is also a movable cylindrical metal ring fitting accurately and occupying the centre space between the outside of the shute chamber and the inner periphery of the wheel as shown in figures 2 and 4, at *y*. It is pierced with slots equal in size and corresponding in form to the external openings of the shutes, and has the edges of the slots bevelled so as to deliver the water with as little interruption as possible, in whatever situation they may be in reference to the openings in the shutes. The ring is moved or shifted round horizontally, so as to close to a greater or less degree, the openings of the shutes, by any mechanical device.

A very important object is claimed and obtained in this patent, viz., the adjustable lip sliding on the inner face of the buckets to regulate the openings between the outer edges of the buckets, and thereby the flow of water from the wheel, thus adapting the lines of this turbine to the head of water and amount of work to be done, however varying these may be. The water is taken in at the bottom of the wheel and every inch of head is made available. In some situations at different times of the year, the head and quantity of water vary greatly; this wheel is specially adapted for such places. The wheel is simple, strong and durable, and not liable to be obstructed by ice. The inventor is of the firm of Jagger, Treadwell, & Perry, Eagle Foundry, Beaver street, Albany, N. Y., where good castings can always be assured, and from whom more information can be obtained by letter or otherwise. We would state here that we have seen some *unsolicited* letters from respectable persons who have been using this improved wheel, who speak in terms of the highest praise respecting its performances.

Inter-Oceanic Canal.

C. Trautwine, Civil Engineer, and author of some excellent books on engineering, who has just returned from exploring a canal route from the Atlantic to the Pacific Ocean, by way of the rivers Atrato and San Juan, in New Grenada, South America, reports that the canal mentioned by Humboldt, as having been executed a long time since, by a native priest, really never existed. Canoes are, even at the present day dragged across the intervening isthmus between the two rivers, but no water communication has ever been effected. Mr. Trautwine also speaks unfavorably of the route by the river Napipi. He, however, represents all the region to the east and south of the Atrato as abounding in gold, which is washed by the natives from the sands of all the streams which flow into the Atrato, from the east; and expresses his belief that the gold veins of the Cordillera mountains, in which those streams have their rise, are fully as rich as those of California. The geological features of the mountains of both regions, he says, are similar. The gold placers, or washings, are not confined to the beds of streams, but, according to Mr. Trautwine's representations, it is only necessary to remove an upper stratum of vegetable earth, in order to arrive at the gold bearing gravel over the whole country.

Receipt for Joining Glass.

Melt a little isinglass in spirits of wine, and add a small quantity of water. Warm the mixture gently over a moderate fire. When mixed by thoroughly melting, it will form glue perfectly transparent, and which will reunite broken glass so nicely and firmly that the joining will scarcely be perceptible to the most critical eye. Lime mixed with the white of egg forms a very strong cement for glass, porcelain, &c., but it must be done neatly, as, when hard, the superfluous part cannot easily be smoothed down or taken off.

California Statistics.

California contains four hundred thousand square miles. This would give eight States as large as New York State, fifty as large as New Jersey, and fifty-seven as large as Massachusetts. With a population per square mile equal to that of New Jersey, California would support eight millions of inhabitants; and if equal to New York twenty millions; and if equal to Massachusetts, forty millions, or fifteen millions more than the present population of the entire United States.

Iron Pavements.

The experiment of using iron pavement is being tried at Boston. The blocks are twelve inches in diameter, eight inches deep, one inch thick, of cast iron, cylindrical in form, hollow, and divided into cells which will be filled with gravel. The blocks are so made that when properly laid the edges overlap in such a manner, as to keep the whole firmly set.—This paving is being laid merely as an experiment, for the purpose of seeing what effect the frost will have upon it.

The irritating grain of sand which, by accident or incaution, has got within the shell of the oyster, incites the living animal to secrete from his own resources the means of coating the intrusive substance and thus germinates the pearl.

MISCELLANEOUS.

New Self-Adjusting Carriage Springs.

No department of mechanical industry has been subject to more innovations than that of carriage-making, not only in the shape of the body, but also in the arrangement of the wheels, axles, and springs These latter, in particular, have been indefinitely experimented upon, and if fixed laws could always be laid down after a series of trials, the form and arrangement of carriage springs would long ago have been a settled fact. That such is not the case it is superfluous to mention, for no springs hitherto made for carriages have combined the requisite lightness and strength, they being either defective in one or the other, some makers sacrificing strength to lightness, and others vice versa. To attain both these advantages combined is the great desideratum, and we are happy to record the union of these two qualities in a new description of carriage spring invented by M. G. Hubbard, of Rochester, and which was patented July 22nd, 1851. The improvement consists in using a curved bottom and springing a bar around it, which thus adjusts itself to any weight placed upon it. The elastic force of the spring, in this position is exerted upon the whole bar, so that, in its operation, the material is not in the least disorganized nor its properties impaired. Another of the peculiarities of this improvement is the employment of wood for springs, which forms a distinguishing feature of the invention.

Every previous attempt of this kind has been unsuccessful from the difficulty of obtaining suitable proportions, and particularly the requisite length, which obstacles have been triumphantly overcome by the inventor. The use of wood for springs appears destined to form an epoch in the history of carriage building, and so successful has been its application, that Mr. Hubbard, is about to employ them for railroad cars. They can be used for every description of vehicle, however heavy, and some idea of their strength may be conceived when we state that those intended for stage-coaches will require over two tons to bring them down to their bearing, although they weigh less than 50 lbs. They will spring as delicately while carrying but one passenger as when carrying twenty, and it must be evident to any one that in this position they combine a degree of strength that never can be used, and durability in proportion to their simplicity and strength. A buggy with these improved springs was exhibited to us by Mr. Lewis, the agent for the patentee, and we can safely say that it exceeds anything of the kind that we have ever before seen, uniting everything desirable in a carriage. In this opinion we are not singular, for its merits were tried at the New York State Agricultural Meeting, in July, when the Committee spoke in the most flattering terms of the improvements, and awarded the patentee their highest premium, which has also been bestowed at other similar exhibitions.

For further particulars respecting these new improvements, address M. G. Hubbard, Rochester, N. Y.

Performing Somersets from a Balloon.

A late Paris letter says—The aeronauts are bent upon rendering their profession every day more and more perilous. During the whole of the past year the ascensions from the Hippodrome have been made with gymnasts suspended beneath the car, executing their terrible exercises during the passage of the balloon to the clouds. The last experiment was the reverse of this. It consisted of the descent of the parachute from an enormous altitude, with M. Godard hanging below it. He turned somersets and performed all kinds of rigadoons in the air, from the time when the cord was cut till it was time to look out that he touched the ground with his feet. The experiment was successfully and gracefully performed.

This is the most wonderful feat of lofty tumbling ever performed by a mortal man. It takes the French to do up these things in grand style.

A meteor of a very large size was seen to fall at Roma, Texas, on the night of the 20th ult. The phenomenon was accompanied by a slight shock of an earthquake, which agitated the river for a few moments, and shook the windows in frame houses. The meteor appeared about the size of a thirty-two pound cannon ball, and caused an illumination as brilliant as the noonday sun would.

[Reported expressly for the Scientific American]

Lectures on Chemistry.

[An abstract of a Lecture on Combustion delivered before the Mechanics' Institute, at Cincinnati, Ohio, by Prof. Chas. W. Wright.]

By combustion is commonly understood the chemical union of a combustible body with oxygen gas—the latter being called the supporter of combustion; but this definition is incorrect as a philosophical expression, for no one substance is a supporter of combustion, nor is any one intrinsically a combustible body. Thus, if a chandelier be suspended in one of the large gasometers, at any gas manufacturing establishment, and atmospheric air transmitted through it, it can be ignited as it issues through the burners, and will burn in the same manner as ordinary coal gas does in the atmosphere, showing that coal gas will support the combustion of air. The proper definition of combustion is, therefore, the chemical combination of two or more bodies with the evolution of heat, and sometimes light. The terms combustible body and supporter of combustion, however, retained by chemical writers, and the use of them, though expressive of an erroneous idea, are convenient, and will not mislead if properly explained. If a body be volatile, its combustion is attended with flame, as sulphur, phosphorus, &c.; if not volatile, the combustion, though attended with the evolution of heat and light, is not acaompanied with flame, as charcoal, coke, iron, &c. Most organic bodies burn with flame from the fact of their containing a large quantity of hydrogen, the most volatile body in nature.

Ordinarily the combustion of a body in air is extremely rapid; but sometimes it takes years for its completion. Thus, when iron is burned in oxygen gas, or the smith's forge, great heat and light are evolved, and the process is soon completed; but in the rusting of the same quantity of iron in the air, an equal amount of heat is evolved, although it may take years to complete the operation. The heat being given out gradually in the latter case, s not taken cognizance of. The gradual combination of a body with oxygen is called "low or slow combustion." The rusting of all metals, as iron, zinc, &c., is due to low combustion. Low combustion is more striking among organic bodies. Thus, the rancidity of fats and fixed oils, are instances of low combustion. They become rusty, in fact, by combining with the oxygen of the atmosphere, and undergoing partial combustion. Butter is more prone than most fats to this kind of change, and hence the most of it sold in cities is rancid or rusty. The decay of all organic matter is nothing more than its low combustion. We have instances of it in the decay or rotting of wood, where the same amount of heat is evolved as if it had been burned in an ordinary fire, but being given out slowly, it is not taken notice of. The conversion of the proto-carbonate of iron into the peroxide, in the disintegration of rocks, is another instance of low combustion, and is the cause of their changing from a dark color to a light yellow.

The quantity of heat evolved, during the combustion of a body in air, is in proportion to the amount of oxygen consumed, and does not depend upon the amount of the combustible employed. Thus, one pound of oxygen in combining with charcoal, heats from 32° to 212° 29 pounds of water; and hydrogen, under the same circumstances, heats 29½ pounds of water from 32° to 212°, so that it matters but little what combustible is used, the amount of heat evolved being regulated by the quantity of oxygen consumed. That substance is most valuable as fuel which will consume the largest amount of oxygen in a given time, and yields the smallest quantity of volatile product after combustion. The cause of the evolution of heat during combustion, has never been explained, and although numerous theories have been offered, and many experiments instituted to account for it, we know no more about it now than we did in the days of Lavoisier.

The force that can be generated by combustion is almost incredible; thus, Sir J. Herschel has calculated that in the proper combustion of a bushel of coal, under a steam boiler, a force can be obtained sufficient to elevate 70,000,000 pounds weight a foot high, and yet the sun's rays exerted the same amount of force in decomposing the carbonic acid absorbed by the leaves of the plants during the growth of their woody fibre, out of which the coal was formed. Another interesting circumstance, connected with wood, coal, peat, and all ordinary combustible substance, is the fact that they are the only bodies in nature that are fitted for fuel, the only ones that pass off in invisible and in small quantities, harmless forms of matter—the only ones that are re-converted into the very same condition that they occupied before they were consumed.

Combustion takes place only at the point where the bodies that burn are in contact; this is best seen in an ordinary flame, as that of a candle. All common flames consist of a hollow luminous shell of light, the interior of which is filled with combustible gases, as may be seen by depressing a sheet of wire gauze over them, which gives a section of the flame. Flame is composed of three distinct portions, each possessing different properties. The inner dark portion of flame consists of a cone of vaporized combustible gases, which may be drawn out by means of a small tube, and ignited. Another portion, which may be described as the middle cone, consists of little lumps of charcoal, or lamp-black, heated to whiteness. In this part of the flame the hydrogen of the combustible gases alone burns, it having a greater affinity for atmospheric oxygen than the carbon, combines with it, displacing the lumps of carbon, which, from their high temperature, constitute the luminous part of flame. At the outer portion of flame another cone may be observed where the light gradually disappears, and here the combustion is complete; the little lumps of carbon being consumed, light is no longer evolved, although the temperature is higher in this part of the flame than any other. The luminous part of flame, then, consists of particles of solid matter heated to whiteness. Gaseous matter cannot be heated white-hot by the most intense degree of heat. The proper place for igniting a combustible body, in all ordinary flames is near the summit of the outer cone, where the temperature is highest, and the air in excess.

Mackerel Fishing.

Reports from the Gulf of St. Lawrence state that the mackerel fishing has been unusually unsuccessful this season. This is attributed by fishermen not to a want of fish, for there was abundance, but to the prevalence of high winds, which by agitating the water rendered it muddy and prevented the fish from biting. On the Bay Quinte considerable quantities of white fish are caught.—This year about 1,500 bbls. have been taken. The exertions of the fishermen are receiving a new stimulus in the increased price of their wares. Before this season the price has seldom exceeded $3 a bbl., but owing to an American demand it has now risen to $4,50 and $5. White fish are also caught on some parts of the Georgia Bay, but the enterprise has not been carried on to any great extent.

The Cocoa-Nut Tree.

Mr. Treloar of Ludgate Hill, London, the cocoa-nut fibre manufacturer, has published an interesting pamphlet, showing the uses to which the various parts of the cocoa-nut tree are applied. The purposes of utility to which this tree may be put are very numerous. The Cingalese have a saying, "that it has ninety-nine uses, and the hundredth cannot be discovered.". From the full-grown leaves are formed mats, carpets, baskets, sails, tents, and liquid measures. The cocoa-nut oil yearly imported into England is valued at £100,000. By means of mechanical processess, secured by patent, the value of cocoa-nut fibre has been much increased. It has been found suited for the production of articles of great utility and elegance of workmanship. A Great Exhibition prize medal was awarded to Mr. Treloar for the best specimens of matting, mats, brushes, mattresses, and other articles made of cocoa-nut fibre.

The Manager of the Electric Telegraph Company at Glasgow, Scotland, states that the transmission of intelligence over the wires was suspended in consequence of an aurora borealis, which prevailed at the time.

Anthracite Coal for Locomotives.

The annexed is from the Philadelphia Ledger. We have seen the accounts spoken of in our English exchanges about the performance of McConnell's engines manufactured by Fairbairn, but the description was too vague about their construction to warrant us in asserting them to be like those of Mr. Millholland: "Some months ago we gave a rough description of the Millholland engines, used on the Reading Railway, in this State. They have been steadily in work ever since, doing full duty, and making extra speed with passenger trains, and the company now consider the superior adaptation of this fuel to travelling engines as a settled matter. In England and France, coke is used at great cost. But we find in a London paper of last month, that two new express passenger engines, essentially on Mr. Millholland's plan, are in use on the London and Northwestern Railway, giving great satisfaction. No credit is given by that paper to our Pennsylvania friend, from whom we presume the principles of the invention were derived. But the engines have the same gas burning chamber behind the fire box, supplied with hot air, in the same way substantially. There appears, perhaps, one novelty, viz.:—The heat from the boiler is used to dry the steam before its effective force is given to the pistons. Mr. McConnell, the assumed inventor, claims that anthracite coal from the mines of South Wales can be used in these engines, at a saving of one-half the cost of bituminous coke, and a complete riddance of the many inconveniences incident to other fuels. The presumption expressed is with us a fact established."

Railroad Accident.]

At a trial of a new locomotive on the New Albany and Salem (Ind.) Railroad, a collision occurred with a hog train, by which Geo. Sewer had one of his legs so severely lacerated that amputation was found necessary. He also received other injuries. His life was despaired of. Another man, who had taken a drove of hogs to New Albany, was instantly killed. Amos Sliter, one of the conductors, was badly hurt, and a number of persons were slightly injured. The engineer and fireman jumped off before the collision occurred. The locomotives were injured to the amount of about $7,000.

Railroads in Canada.

A Canadian agent has gone to England to arrange with Peto, Brassey & Co., for the construction of the Trunk line of railway.—The contractors are to get about $40,000 a mile; and the road is to be of a very surperior character, with tubular bridges, such as have never been constructed on this continent.

Anastatic Printing.

In his Report for the year 1845, the Commissioner of Patents says:—"The extraordinary art of anastatic printing has been patented in this country by foreigners, and, as far as ascertained, has been practised with success in the city of London. The patent was granted for the process, and not, of course, for the result or principle. The credit of the discovery and of the first successful production of copies from an engraving or other printed work, belongs to one of our own countrymen, Mr. Joseph Dixon, of Mystic, Conn., (now of Jersey City,) and according to the most creditable testimony, his results are far more perfect than any hitherto attained by others. Mr. Dixon has been for many years engaged in perfecting his art, and I can testify from personal knowledge of his success in this invention many years ago. But, as the office was not in possession of the details of his process, no reference could be made to him, and the patent was accordingly granted as above stated. Mr. Dixon's discovery is mentioned in a work entitled "Science Applied to the Domestic and Mechanic Arts, by Rev. Alonzo Potter, published in 1841, and in the same work is given a specimen of Mr. Dixon's printing."

The monthly statement of the Philadelphia Mint shows the receipts of gold for November to have been $7,260,000: the coinage $4,990,543. The total receipts for the past eleven months are set down at $47,699,354.

Machinery and Tools as they are.—The Steam Engine.

(Continued from page 99.)

LAND ENGINES—The constructor of land engines has more opportunity to develope the economical working of steam than the makers of locomotives and engines for steam vessels who are cramped by the restrictions imposed upon them from the character of their work. It may be asked,—by what standard is the excellency of a stationary engine to be determined? To this the answer is plain, it is determined chiefly by the amount of duty performed by a given quantity of fuel,—a circumstance influenced greatly by the boiler, but also affected by the construction and management of the engine. Stationary engines are now generally non-condensing, the primary expense being less, and the machinery more simple, although where economy of fuel is of great importance the condenser is still retained.

It is a common mistake to suppose that a high pressure engine is necessarily non-condensing, a mistake which will be corrected by a knowledge that the expression "low pressure" is now applied to steam that a few years since would have been considered far too high for a condensing engine. Thus 4 lbs. per square inch above the pressure of the atmosphere in British marine boilers was thought sufficient, whilst at present it is not unusual with them to use steam at 14 and even 16 lbs. per square inch. But stationary engines are worked at a much higher pressure, and too often the advantages derived from expansion are neglected, although it is when the steam is at a high pressure that the benefits of expansion are most available.

The engines used for the Cornish mines in England have attained some celebrity, owing to their economical working, the steam being expanded from about one-sixth of the stroke, when, by the evaporation of about one pound of water, they are capable of raising 120,000 lbs. one foot high; whereas, a low pressure engine, with the same evaporation, and steam cut off at one half of the stroke, raises only 53,000 lbs. the same height. Perhaps the best construction for a land engine, when it is desired to use the steam expansively to its full extent is to admit the steam freely into a small cylinder during the whole of the stroke, but on leaving this cylinder to allow it ingress into a larger one, where it expands before its escape into the condenser.

The oscillating cylinder is much employed for small land engines, as it affords a cheap substitute for the slide valve, if formed in the usual manner, by which one of the gudgeons or trunnions is made to regulate the entrance and exit of the steam, while the other gudgeon or trunnion can be employed to work the feed-pump. The favorite construction for land engines throughout the United States is that in which the cylinder is placed horizontally on flat beds, on these latter are secured the guide bars, main plummer blocks, &c. When this is not the shape, we generally find that compact form employed in which a vertical cylinder is placed on a pedestal, while the cranks below are worked by side rods. Small portable engines for agricultural purposes are now being rapidly introduced, in which case the boiler generally is cylindrical with internal fire-place, and the engine placed on the top of the boiler which is fixed on wheels so as to be drawn by horses. The diameter of the cylinder is, in general, about 7 or 8 inches, and it has been found advisable to encase the cylinder, steam pipe, and pump, either in the smoke-box, or some other part capable of protecting them from the frost.

No part of the stationary engine has lately been subject to more modifications than the governor, to supersede which a water-regulator is now often used, a variation from the usual form of the governor was on exhibition at the last Fair of the American Institute, and was mentioned in our report at that time. It is often also constructed in a rather original manner, consisting of a single hollow ball encircled by a zone, there is an opening through the under side to admit an upright spindle, which is attached to the ball by a joint in its centre. One side of the ball and zone is heavier than the other, and consequently, when at rest or moving slowly, it hangs down, but when driven fast the centrifugal force of the heavy side overcomes its gravity, and the zone assumes nearly a horizontal position. When this is the case a small link inside the ball lowers the usual brass collar on the spindle, and thus shuts off part of the steam until the gravity of the ball overcomes the centrifugal force, when the throttle-valve will re-open.

We have mentioned the efficiency of the Cornish pumping engines, and comparison shows many points of resemblance between them and the American engines for river steamboats, which latter are so renowned for their performance. The great width of our rivers has been favorable to the system of placing the machinery on deck, which has, by this arrangement, allowed the use of a stronger boiler than is attainable when the engines are below. The striking peculiarities of the American boat engine are visible at the first glance: the trussed beam overhead, the long stroke, the large paddle-wheel, and particularly the arrangement of the cylinder valves, all different from those of the sea-going vessel. It is, however, remarkable that one of the most eminent English machinists has lately departed from his usual practice, and has used, instead, the American system of valves in a marine engine of 400 horse-power. Nor is this, we believe, a solitary instance, the same arrangement having been also lately applied to one of the new steamers belonging to the English West India Steam Co.

Some improvements on the ordinary double spindle valves have also been introduced by a modification of the double beat valve; this is intended to remedy the springing to which the former are occasionally liable. The mode in which the valves are worked, is well known. There are two rock-shafts, one for moving the steam valves, and the other for the exhaust valves. These shafts are worked by separate eccentrics, and give motion to the lifting rods by means of projecting arms, an arrangement that admits of any desired expansion, sometimes only one rock-shaft and eccentric are employed. The expansion is also frequently regulated by having a cut-off or expansion valve placed in the steam pipe like a throttle-valve.

(To be Continued.)

For the Scientific American.

Railroad Dust and Cinders.

During an excursion made the past summer composed partly of a thousand miles of railroad on seven different routes, in Pennsylvania, Ohio, New York and New Jersey, the excessive annoyance caused by the dust and cinders, led me to contriving some means for the abatement of so great a nuisance, and I now offer you my suggestions in the belief that whoever shall accomplish such an object will greatly promote the comfort and pleasure of the travelling public, and also benefit the railroad companies, by inducing many to travel, who having once made the experiment, have concluded, like myself, that necessity alone would lead them to repeat it.

I would attach the apparatus to the tender of the locomotive, which should be made of the same length as the passenger car, or about thirty feet. Around the bottom of it, and enveloping the running-gear, I would place a tight apron of sheet iron, extending down very nearly to the level of the rails. This would form a large box, having the apron for its sides and ends, the body of the car for its top, while its bottom would be the surface of the earth. Into this box the exhaust steam is to be conducted by a large hose of sail-duck or other material. Immediately the steam expands over the surface of the ground, which, being parched by the rays of the sun, is in a suitable condition instantly to absorb a portion of the watery vapor in contact with it. And the more finely the earth is pulverized the more rapidly absorption will take place, so that in the space of one second and a half, a sufficient quantity of moisture will probably be received to prevent the dust from rising. This is about the length of time each particle would be exposed to the action of the vapor, with a car thirty feet in length and a speed of thirty miles an hour. A shorter car might answer with a higher speed, but experiment only can determine this point. The principle is simple—to bring the steam into quiet contact with the dust over an extended surface. The connecting hose should enter the box in such a manner as to project the steam horizontally along the bottom of the car, from which it will descend without any violence of motion, and escape quietly between the lower edge of the apron and the ground. The smoke and cinders being forced along in company with the steam, will no doubt be thoroughly condensed and extinguished, and deposited between the rails, instead of being discharged above to vitiate the atmosphere. The ordinary spark-catcher will be dispensed with, and perhaps even the pipe—a connection only being required with the duster box. Advantage might also arise from the moistening of the rails behind the locomotive, causing an important diminution of resistance to the train, while it does not impair the tractive power of the engine.

The above general description will enable any intereated to test the plan, and having myself no connection with mechanical pursuits, I offer it to your valuable journal as the best means of bringing it under the notice of such, with this remark, however, that I have no intention of taking a patent, not doubting that if successful, those companies adopting it will take pleasure in gratifying the small privilege I shall ask in return. J., Jr.

Air Heating Pipes.

The apparatus for heating air for blast furnaces as at present employed is liable to objections which have been obviated in an improved arrangement by Jesse Young, of Franklin Furnace, Ohio, who has taken measures to secure a patent. The improvement consists in the use of circular pipes, which communicate with and are supported on each other by means of hollow pedestals (one pedestal to each pipe), which are placed alternately at opposite ends, so that the air passes all round the pipe before it arrives at the pedestal.—The air is admitted by an opening in a rectangular-shaped air-chest, which likewise serves as a base, supporting it altogether on similar hollow pedestals. The whole apparatus is fixed horizontally, which is considered by the best authorities upon the subject as a preferable method to having the pipes in a vertical position. The only objection is that they are liable to break when placed in this manner from exposure to the intense heat; this defect the inventor has ingeniously prevented by the use of the hollow pedestals which, as well as supporting the weight of the pipes, counteract the effects of the heat by the current of cold air circulating inside.

Cure for the Croup.

Dr. Forbes, of Boston, relates, in a late number of the Medical Journal, a case in which a severe attack of croup was cured by the application of sponges wrung out of hot water to the throat, together with water treatment, which he describes as follows:—

"Soon after making the first application of sponges to the throat, I wrapped the child in a woolen blanket, wrung out in warm water, as a substitute for a warm bath, and gave twenty drops of the wine of antimony in a little sweetened water, which she swallowed with difficulty. I persevered in the application of the hot, moist sponges for an hour, when the child was so much relieved that I ventured to leave it.

These applications were continued through the night, and in the morning the child was well.

Ancient and Modern Cities.

We are apt to consider London as a considerable city, and New Yorkers regard their village as an immense municipality. But if the Mayors of Nineveh and Babylon could revisit the earth they would laugh at the pretensions of the moderns. The area of Babylon was two hundred and twenty-five square miles, and that of Nineveh two hundred and sixteen square miles, while that of London and its environs is but one hundred and fourteen square miles.

Chickering's Pianoforte Manufactory.

The above building was lately destroyed at a fire in Boston, by which the owner has been a great loser, but Mr. Chickering's loss is not to be measured by money: the patterns, the scales, and all the drawings, which have been the result of his long experience and close calculations,—the work of many an evening hour of patient thought, have all been destroyed in a night. One instrument in particular will be a great loss. For a year past Mr. Chickering has been engaged in planning and constructing a new piano, which would possess many advantages over those now used in parlors. He had spent weeks and weeks upon its preparation, and had got it so far completed that in a day or two it would have been ready for exhibition. This instrument, with all its patterns and scales, is destroyed with the rest.

Agriculture in California.

At the last meeting of the Farmers' Club of this city, Mr. Shelton exhibited some specimens of the Amole or Soap Plant used by the natives for washing purposes. It resembles the onion and is propagated from off-shoots, constant use of it, however, inflames the hands. From the fibre of the plant an excellent article of hemp could be made. The cultivation of the onion had been attended with the most triumphant success. The same might be said of the beet, which grew to an enormous size. It would be no exaggeration to say that beets weighing one hundred pounds each could be grown in California.—In the places were the largest beets were raised, it should be remarked that the subsoil was moist. The sycamore and buttonwood trees grew with great luxuriance in all parts of the country—as also the ash and alder. But there were many varieties of trees in California unknown in the Atlantic States. He had not noticed any species of elm or sugar maple, though there was, however, a very valuable sugar-producing tree known as the sugar pine, which grew to a great size and produced good timber; in appearance it was similar to the long cone pine. The general planting season throughout the country was in March and April—gardening operations commencing in February as here.

Rev. Mr. Fitch observed that he had discovered, during his journeyings in California, some six varieties of gooseberries superior to any he had before seen. The blackberries and strawberries were much superior to anything we had, and the latter were even superior to the English strawberry. There was also a berry of very delicious flavor, something between the raspberry and the blackberry, which was called the salmonberry.—That name was given it by the Oregonians, who observed that the berries which fell from bushes overhanging the rivers were eagerly devoured by the salmon.

The Chairman observed that he had made a good deal of inquiry relative to the cultivation of the grape in South and North America west, and from what he ascertained on the subject, it appeared there was no grape that was worth anything cultivated in those regions that was not of European stock.

Rev. Mr. Fitch corroborated the statement, remarking at the same time that there was no native grape in California worth cultivation.

Burns and Spontaneous Combustion.

The value of linseed oil and cotton, for burns has long been known. Here is a case of its use, which shows the danger of binding it too closely, when placed upon a wound: a child, in Fredericton, N. B., a short time since, burned its leg against a stove; the mother immediately applied linseed oil and cotton-wool, with a tight bandage over all; in a short time the screams of the child induced the mother to remove the bandage, when it was discovered that the cotton-wool had taken fire and had considerably increased the size of the burn. The reason of this spontaneous combustion was the free exposure of the oiled surface to the atmosphere. Oils and grease spread over an extensive surface, and exposed freely to the atmosphere, oxydize so rapidly as to engender great heat, and ignition, producing what is termed "spontaneous combustion." Oiled cotton put on burns, or used for any purpose, should be secluded from the atmosphere.

The Postmaster General in his report states that "the service between New York and Washington, though much improved, is still defective and unsatisfactory. The endeavors to improve this service, have been rendered abortive by a want of unity among the railroad companies running between Philadelphia and New York." These railroads are the Jersey ones then; what an accommodating set they must be.

NEW INVENTIONS.

Safety Steam Boiler.

Henry Waterman, of Williamsburgh, L. I., has taken measures to secure a patent for an improved steam boiler. The chief object of this invention is to provide a means of relieving the boiler of dangerous pressure without a great loss of steam and without materially or even at all interrupting its proper operation. This is effected by placing on the top of the boiler a cylindrical vessel which the inventor terms a safety-chamber. The said vessel is separated from communication with the steam in the boiler by a metal plate (copper is preferable) which is sufficiently strong to bear the pressure of the steam up to the maximum that may be desired. But if the steam should exceed that pressure it will cause the plate to tear asunder and the steam will rush into the safety chamber, when the pressure will be at once reduced; and as the inventor proposes to make this chamber with a capacity equal to the amount of steam space in the boiler, the pressure of the steam will be reduced one half. From the fact that the water would be likely to foam up into the safety-chamber as the steam rushes in, another plate of the same strength as the boiler is connected to the before-mentioned safety-plate, the only way by which the steam can pass from the boiler to the under side of the latter being through a small pipe provided with a faucet. Supposing that the steam has rent the safety plate and rushed into the chamber, it then sounds a whistle, which informs the engineer of the occurrence: the pressure being by this time reduced, he closes the communication between the boiler and chamber, allows the steam in the latter to escape, and replaces the torn safety-plate by a new one, for which purpose he is always provided with two or three spare plates.

New Cut-off Gear.

Measures to secure a patent for an improved Cut-off for locomotives have been taken by J. E. Wootten, of Pottsville, Pa. This plan of giving a variable movement to the valve is intended by the inventor to be applied to locomotives and stationary engines. On the rock-shaft are placed two vertical arms, having on them a sliding block formed in two parts and connected by a pin. This block is moved to any desired position along the arms by a screw, which is turned by the engineer with the aid of a ball and socket-joint and two bevel wheels operated by a long shaft. A frame is attached to the valve-rod in which fit two boxes, which also connect with the block-pin. It is evident that the valve travels more or less according to the adjustment of the block, which is not only moved as required by the screw, but is by the same means retained in a firm position. It has been said that a ball and socket-joint are used in the operation of adjusting, but it is apparent that it would not act in the manner proposed were it not for two small projections formed on the ball, and which fit into corresponding recesses in the socket.

Rotary Engine.

Wm. Taylor, of Schenectady, N. Y., has taken measures to secure a patent for an improved Rotary Engine. The arrangement of this engine is as follows: a shaft is placed centrally in a fixed cylinder, and around the hub of this shaft are placed the pistons which are pressed against the inner periphery of a circular collar attached to the cylinder. Through this collar are cut the steam ports or openings, which are as wide as the space between the sides of the pistons. When, therefore, the steam issues through these ports, it impels the pistons, which revolve within the collar, and carry the shaft round in their rotation. The mode of applying the steam is likewise peculiar. Between the outer surface of the collar and the inner surface of the cylinder, is a space which the inventor terms a steam chest, there is a stop placed in it to compel the steam to take the right direction. At each end of the cylinder is a head, which bears steam-tight against the sides of the hub and pistons, over this is another head, which serves to keep the cylinder ends also steam-tight. An excellent plan of packing the pistons, where they touch the collar, which is done by adjustable wedges, is one of the claims of the inventor.

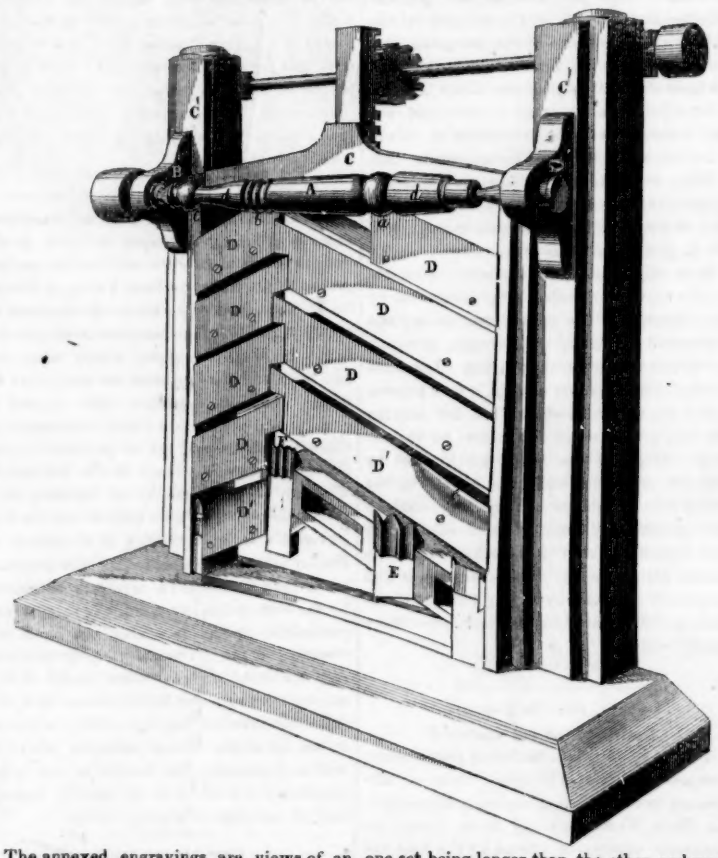
Threshing Machines.

Thomas McClure, of McConnellsville, O., has taken measures to secure a patent for improvements in the above. These are of such a nature as to prevent the grain from being thrown out of or beyond the machine by the force of the threshing cylinder, and to allow of the straw being discharged or drawn from beneath the curve or deflector. This latter being made of a peculiar shape to supersede the ordinary method. The invention likewise consists in a peculiar arrangement of the spouts, by which the grain is perfectly separated from foreign substances.

Improved Straw Cutter.

Measures to secure a patent for an improved Straw Cutter have been taken by Thomas Allison, of Milton, N. Y. The nature of the improvement consists in setting the feed roller obliquely, instead of placing it in a straight line parallel with the cutter. By this means the latter is fed more effectually and less liable to be clogged up than when the feed roller is placed parallel with it. Moreover this obliquely set roller does away with the necessity of placing the knives spirally round the cylinder, thereby obviating the inconvenience that is often experienced in getting to and keeping the spirally arranged knives properly sharpened.

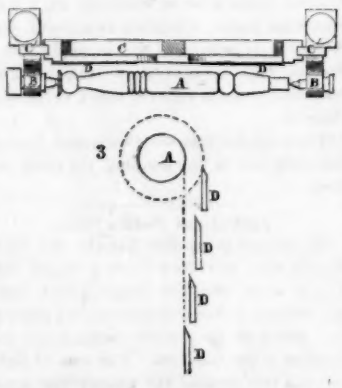
IMPROVEMENTS IN TURNING BEDSTEAD POSTS, TABLE-LEGS, &c.---Fig. 1.



The annexed engravings are views of an improvement in machinery for turning articles of an ornamental character but regular form, either plain or beaded, such as bedstead-posts, table-legs, pianoforte-legs, chair stuff, &c. The inventor is Milton Roberts, of South Levant, Penobscot Co., Me., who has taken measures to secure a patent.

Figure 1 is a front view of the improvement applied to a turning lathe. Figure 2 is a top

Fig. 2.



or plan view of fig. 1, and figure 3 is an end view, showing the stick to be turned with knives and cutters. The same letters refer to like parts on all the figures.

A, in figs. 1 and 2 represents a table-leg, or such-like article, it is centred between the two heads, B B, of an ordinary lathe, and receives a rotary motion by common gearing; C is a rectangular sliding frame, which works up and down in the guides, C′C′, which are attached firmly to the lathe bed. D represents a series of knives or cutters placed within the sliding frame, C, in an inclined position. There are two sets of knives in the frame, the one set being longer than the other, and made to join. By this arrangement they act with a shaving cut when the sliding frame is moved up and down by a rapid motion. The inner ends of both sets of knives incline upwards, and are also a little further from the stock than the outer ends; this makes them act obliquely on the grain of the wood, consequently they make smooth work of it. The two upper knives are placed out in the frame further from the wood than the other knives, and the knives below are set gradually nearer the wood, so that the rough is taken off by the first, and each knife is set in its place to approximate to and finish the stick to be turned, at the end of a stroke. The knives, therefore, have three distinct positions in reference to the horizontal stick, A; first, they are inclined; second, their inner ends are placed out of line with their outer ends; third, they are set in proportion one above the other at a greater and less distance from the stick. E F are tools to make beads and knobs on the stick; they are secured on the lower part of the sliding frame, they are for cutting the beads, &c., on the stick. This stick is represented as finished, the tool, E, cuts the bead, *a*; the one F the beading, *b*, and the one G the knob and bead, *c*. These tools are made of such a form as to cut the desired pattern of beading, &c.; each pattern must have a tool expressly made to cut it out, or the tools may be made in sections, and these joined by screws, so as to change them and make a variety of patterns by the same set of tools.

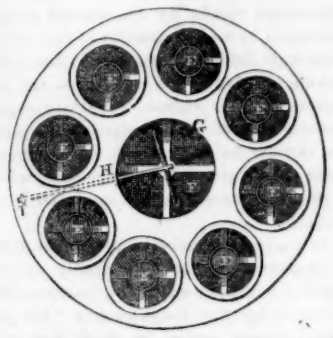
The lowest set of cutters are so shaped as to cut the general parts of the stick the required form. The two ends, *d d*, of the stick, A, are tapered, this has been done by the lowest knives, D′, which are set at *e*, so as to form the said tapers.

Supposing the stick, A, to be rough and to receive a rotary motion by the live spindle set in motion, it is evident when the knife-sliding frame, with all the cutters, is drawn upwards, that the said stick will be cut or shaped by the knives into the form represented. The improvement is a simple and very desirable arrangement of machinery.

More information may be obtained by letter addressed to the inventor.

Improved Locomotive Spark Arrester.

Fig. 1.

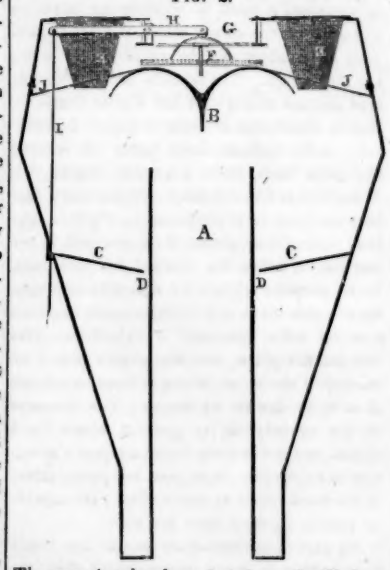


The annexed engravings are views of an improvement in Spark Arresters, invented by Samuel Sweet, of New York City, who has taken measures to secure a patent.

Figure 1 is a plan view, and fig. 2 is a vertical section. The same letters refer to like parts.

The superiority of this spark arrester over most others, consists in placing a deflector, B, strengthened by braces, J J, over the top of the smoke-pipe, with a partition, C, near the centre of the outer case, so shaped as to direct the sparks to the bottom, while the force of the steam is exerted upwards. The sparks falling beneath, through an opening, D, which is situated round the smoke-pipe and between it and the partition, C. The top of the spark arrester consists of eight funnel-shaped sieves of wire-cloth, E F, which are sunk downwards with a circular opening, G, in the centre, which is covered with a valve, F. The valve is so arranged that it can be opened or shut by the engineer, as required, by means of the rod, I, and lever, H, the said rod being placed within reach outside the casing. By this arrangement it will be perceived that it is utterly impossible for any sparks to issue out of the smoke-pipe, an evil that has hitherto been never completely prevented, and yet it is always in the power of the engineer to obtain a greater amount of draught, it required, by opening the valve in the manner pointed out. This however is not likely often to be required.

Fig. 2.



The arrester has been tested on the Hudson River Railroad and on the Harlem, as well as some others, where the plan has given great satisfaction, and been eminently successful.

This invention is so simple in its construction, that further explanation would be unnecessary. It is, however, worthy of notice that the steam, in passing out at the top, acts with force against the wire-cloth, and thus keeps it clean and free from any obstructions. The smoke is likewise, by the same arrangement, allowed to ascend without being drawn into the current that catches the sparks.

More information may be obtained by letter addressed to the inventor.

Scientific American

NEW-YORK, DECEMBER 18, 1852.

Award of Prizes.

In the prospectus of this volume of the Scientific American, we offered four separate prizes for the four largest lists of subscribers.—These prizes were, 1st, "An elegant silver pitcher." 2nd, "The Iconographic Encyclopedia." 3rd, "Dempsey's Machinery of the Nineteenth Century." 4th, "Naval Dry Docks of the United States." The time specified has now arrived for declaring the names of those who have gained said prizes. They are, 1st prize, John Marston, of Saratoga Springs, N. Y.; the number of names sent 125. Saratoga is an enterprizing town, but previous to this we had only three subscribers by mail in that place. 2nd prize, to L. A. Miller, Woodstock, Vt.; the number of names sent, 101. 3rd prize, to John J. Conley, of Richmond, Ind.; number of names sent, 72. 4th prize, to R. S. Titus, of Flushing, Long Island; the number of names sent 62. As we have heretofore stated, if the gentleman who has gained the silver pitcher prefers to have its value in money, viz., $60, we will forward the same to him,—his choice is our law. The books which have been awarded are illustrated works of a practical standard character, and are not merely useful for a single reading, but as works of reference for ever. We have no doubt but the gentlemen who have gained them will feel satisfied.

We take this opportunity of returning our sincere thanks to other competitors who have sent us lists, a number of which are nearly as large as that for the fourth prize. Whatever kind turn we can do for you, we will be happy to do it, and you may be more successful on another occasion.

It would not be just or honest if we pretended otherwise, than that one great object of offering these prizes was the extension of our circulation, it was; but at the same time, we believe the Scientific American to be a useful paper, a standard work, and will return full value to every subscriber for his money. It is not so large as some papers of the same price, but the value of no paper should be estimated by its size or the amount of its mere reading matter—its quality—its real worth is the only standard. We can buy forty yards of calico at one shilling each, for one of broadcloth at five dollars, but a yard is a yard all the world over, the quality, not the quantity makes the differenee. We have the means of obtaining more varied stores of useful information about science, art, and new inventions and discoveries than any other paper on our continent. We also spend more money to obtain such information, than any other paper, and our engravings are the best illustrations of mechanical subjects ever attempted in our country. Our experience, our agencies, and correspondence with qualified and able men in different parts of the Union, in France, Germany and Britain, enable us to obtain the *first and most reliable* information about everything that is new in science and art. It has taken—as it always must—a number of years to discover, arrange, and perfect the means of obtaining such information, and now we rest firm and secure on a solid basis of a primitive formation. We feel, and no doubt all our friends do the same, in commending the Scientific American to persons for subscription, a consciousness of returning them a full equivalent for the money they may subscribe. The very engravings of machinery, &c., which we present in one volume are worth more than five dollars to any mechanic, artisan, and inventor, and we confidently aver that the same number and same amount of correct reading matter accompanying such illustrations cannot be obtained in any paper or magazine in the world, and in no book for three times the same amount of money. It is also the only real inventors' advocate, friend, and paper in the United States. We publish a number of valuable and rare receipts; and communications of a most practical, scientific, and useful character, by some of the ablest men in our country, frequently appear in our columns.

Our general subscription list has greatly increased, and we are therefore enabled to expend more upon our present volume than any of the preceding seven. We return our thanks to old friends for the kind interest they have manifested in our success, and to our new friends, we say, our friendship will be much closer before the end of the present volume.

Ammonia.

This substance is placed by agricultural chemists at the head of all fertilizers. Guano derives its chief value from its presence, as it contains over 60 per cent. of it. Could it be obtained cheap in the state of a salt, like the muriate (salammoniac,) a valuable and cheap substitute for guano could be made artificially. But it is a dear substance, and farmers cannot afford to buy it. There appears, however, to be some prospect of obtaining a cheap supply, as it is stated that "Prof. Gale, of the Patent Office, has recently received some crude sal-ammonia, brought from Chincha (whether the Peruvian valley or not we cannot say,) which has recently been discovered in a vein like that of metallic ore, and in quantities sufficient to render it an article of commerce." We hope this information is true, but the quantity may be as moderate as that now found in all volcanic regions. Ammonia is a compound of two gases, viz., nitrogen and hydrogen.—They do not combine directly in their gaseous state, but if a great number of electric sparks be passed through a mixture of them, especially if acid vapors are present, a combination takes place, and a third body—ammonia—(NH^3) is formed. It is always found in the rains of thunder storms, hence it is concluded that the lightning is an active agent in its formation—it is the marrying minister. These two gases, however readily combine in a nascent state; a piece of iron rusting in the air is almost constantly giving rise to a small portion of ammonia. The moisture which covers the iron dissolves the atmospheric air; the oxygen of this air unites with the iron to form the rust—oxide—and the pellicle of oxide constitutes with the metal, a voltaic element strong enough to decompose water. The oxygen thus set at liberty unites with a new quantity of iron, and the nascent hydrogen of the water finding nitrogen in solution in the moisture, unites with it and forms ammonia.

When zinc is dissolved in dilute nitric acid, the liquid is found to contain a marked quantity of the nitrate of ammonia. In the solution of the zinc in the dilute acid, hydrogen gas is set free and nitrate of oxide of zinc is formed, but if zinc is treated with concentrated nitric acid, the zinc is oxidated at the expense of a portion of the nitric acid, and as a mixture of hydrogen and nitrogen is separated, these two gases meeting in the liquid in a nascent state (act of evolution) unite and form ammonia. A notable quantity of ammonia is therefore found in the liquid. It is the case with other gases beside nitrogen and hydrogen, that although they do not readily combine when brought together in their distinct gaseous state, yet do so freely when simultaneously set at liberty in the same solution.

Animal matters burned under exclusion from the air, give off a considerable quantity of the carbonate of ammonia. This is dissolved in hydrochloric acid, and produces the salammoniac of commerce. Ammonia is obtained in a gaseous form by mixing powdered salammoniac with about an equal quantity of dry *slacked* lime, and heating it in a retort having a bent tube. The gas is abundantly discharged, and may be collected in the common way over mercury in a trough. Ammonia is a colorless gas of a very pungent odor, causing tears to flow freely. It is a powerful alkali, and neutralizes strong acids, such as sulphuric, &c.—In water it is very soluble, and being mixed with it, is called aqua-ammonia. Under a pressure ot five atmospheres, it becomes liquid; it extinguishes the light of a candle, and does not burn under ordinary circumstances; if breathed undiluted it is fatal to life.—It is very volatile as a liquid, and is employed to give that pungent odor to what are termed smelling salts. The producing of tears which is a peculiarity of onions, is attributable to ammonia. In the destructive distillation of bituminous coal in making gas, a quantity is produced which has all to be removed, for it detracts from its illuminating properties. This is done by "water cooler—a vessel through which the gas passes before it goes into the retaining tanks and pipes for distribution. It would be well for agricultural chemists to devote their attention to the artificial production of a cheap ammoniacal salt, as the Lobos Islands are not yet free property for all the world.

Critical Dissertation on Steam, Hot Air, and Gas Engines.

One of our exchanges asserts that preparations are already in progress to contest the claim of Ericsson to the invention of the "caloric engine." It also quotes from the "London Mining Journal" of Nov. 6th, a paragraph taken from the Augsburg Gazette (a German paper,) which claims the invention for a magistrate named Prehn, of Lauenburg (Germany) who invented a caloric engine some years before Ericsson. It says:—

"By a series of costly experiments he succeeded in expanding and contracting air so rapidly by alternately heating and cooling, as to prove its capability as a motive power. He endeavored to get a patent for England, but found he should lay himself open to opposition and law suits; and although he obtained one for Berlin, and had testimonials of success from Macpherson and George Stephenson, in England, Von Humboldt and Rapsold, of Hamburg, and Schumacher, of Altona, ill-success brought him to the grave, leaving a widow and seven children."

Public journalists and mere literary men generally display a great amount of ignorance respecting the history of inventions. Some believe and assert that James Watt was the inventor of the steam engine, while steam had been applied to move machinery before he was born. Some assert that Fitch, Fulton, or Symington were the first inventors of the steamboat, while a patent was taken out for such an application in 1736 by Jonathan Hulls. There is a great difference between an improver and an original inventor. The original invention may not be much, and an improvement may be everything, and vice versa. The caloric engine, about which so much is just now said, is simply the application of heated air to propel machinery, as a substitute for steam. Now this is no new application nor invention, and neither Prehn nor Ericsson are the first inventors, and it remains to be shown yet whether as an improvement the Ericsson engine will be anything more than has already been accomplished.

In 1827, two brothers (one a clergyman, we believe,) named Stirling, in the city of Glasgow, Scotland, took out a patent for a hot air engine, which was illustrated and described in "Galloway's History of the Steam Engine" in 1832; this patent was secured for the application of the heated air to propel machinery in a particular manner 25 years ago. This engine communicated motion to a piston by alternately heating a portion of air connected with one side of the piston, and at the same time cooling that in connection with the other side. This was done by means of two air vessels, the one communicating with the upper and the other with the lower side of the piston. An air vessel was filled with thin plates of iron perforated with holes, or with pieces of brick, and the lower part of each air vessel was heated by a fire placed under it, pretty much the same as the Ericsson engine. The Stirlings, however, did not claim hot air in their patent specification, and the conclusion is—they did not believe themselves to be the first inventors; it is probable that they knew a patent had been taken out in 1824 for an atmospheric engine, by E. & J. Prentice, Baltimore, Md., or the one with two cylinders by W. Willis, of Charleston, S. C., in 1826; at any rate, the application of hot air to propel machinery is anything but a new invention. Ericsson took out his first patent in 1834, a long time ago, and the illustration of his principle, as exhibited on page 60, last volume, Scientific American, appears to embrace the very principle of Stirling's, only the arrangement is not the same. The principle of the new caloric engine, which as asserted, will make it successful and more economical than the steam engine is, that after the heated air has acted upon the piston, it is not lost—the heat is saved and applied over again. This very principle is described as belonging to the Stirling engine, which was improved and patented twelve years ago. We are thus particular because we wish to let the public know distinctly that the "hot air," alias *caloric engine*, is not a new nor untried invention, very different from what many have been led to believe by the numberless feuilletonists of our daily, weekly and monthly periodicals.

Gas Engines.—Many accounts have lately been spread before the public, about the employment of ether, chloroform, carbonic acid gas and other gas engines, as substitutes for the steam engine. As far back as 1824, a patent was taken out by Samuel Brown, of London for the United States, and Minus Ward, of Baltimore, took out one in 1827, for a gas and heated air engine. Thos. S. Brown obtained his English patent in 1823. It was called a *gas vacuum* engine, and was actuated by the inflammation of hydrogen in a vessel containing a portion of atmospheric air sufficient for combustion. This created more sensation in 1826 in London, than the caloric engine now does here; it, however, was a failure. In 1825 the celebrated Brunel obtained a patent for employing carbonic acid gas as a motive agent after it had been reduced to a fluid by Humphrey Davy, but he did not test it, being satisfied, we suppose, that it would be more expensive than steam. Benjamin Cheverton, an English gentleman, who sometimes writes now for our London scientific cotemporaries, obtained a patent in 1826, for an improved carbonic acid gas engine, but it, like Brunel's, amounted to nothing at all. A patent was taken out the same year (1826) by a Mr. Howard, for an ether-alcohol engine, which was identical in principle to the one said to be now invented by Mons. Tremblay, of France, for working with chloroform, which is a similar chemical agent. Gunpowder, smoke, and we do not know how many more substitutes have been proposed and tried as substitutes for the steam engine, not one of which has maintained the least semblance of a decent competition. The reason why, we will endeavor to set forth next week.

Falling Houses Again.

Guilty indeed are the magistrates of New York City for the many lives which have been lost by the falling of buildings because of insufficient workmanship. Every few weeks, a building in the course of construction tumbles down, and some poor fellow is killed, leaving perhaps a widow and small family, wrecked on the cold world's bleak shore.—On Tuesday last week (7th inst.,) a large five story brick building, 50 feet front and 40 feet deep, together with two large houses on Thirty-second street, this city, in course of erection and near completion, fell with a terrible crash, and instantly killed three of the persons who were at work, and severely injured a number of others. The cause was insufficient strength of supports. When shall we be able to cease chronicling such calamities.

All Gone, All Gone.

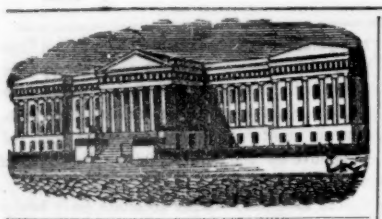
At the commencement of the present volume, we printed 5,000 extra copies which we concluded would be sufficient for the subsequent demand. It is now but 14 weeks since Vol. 8 was commenced, and to the disappointment of many we are obliged to announce that the entire editions of the first four numbers are all gone, and that we shall not be able to furnish the back numbers to any parties who order after this date. Of Vols. 6 and 7 we have a few, complete, left, and have reserved a few sets of Vol. 8, from the commencement to supply those who have ordered and paid for the volume, but who prefer receiving it at the end of the year.

Hydraulic Pumps.

Thirty-six sets of hydraulic pumps are in the process of construction at the Washington Navy Yard, designed for testing steamboat boilers required under the law of the last session of Congress, which was passed with a view to the safety of passengers on board of vessels propelled in whole or in part by steam.

A Large and Small Wheel.

We have been considerably edified with the discussion which the question of "a large and small wheel," has provoked throughout the country. In quite a number of our cotemporaries, long communications have appeared on the subject, and editorials two and three long columns in length have been produced.



Reported Officially for the Scientific American

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING DECEMBER 7, 1852

MACHINERY FOR BENDING PAIL BALES, ETC.—By Robt. Bunker, of Rochester, N. Y.: I claim the combination of the saddles, brake, bar, and movable block, all operating as described.

SEED PLANTERS—By L. W. Colver, of Louisville, Ky: I claim making the cells in the tops of the grooves, so that they shall carry single grains, and combining therewith a cleaner, which extends into the groove behind the seed, as each cell in turn arrives at or over the seeding tube, for the purpose of carrying around and depositing with certainty the seeds or grains, singly, substantially as described.

SAW GUMMERS—By R. S. Cramer & C. C. Blossom, of Somerville, Ohio: I claim the nut, having gudgeons occupying notches in one of the jaws of a saw gumming apparatus, in which the cutting portion is situated between the power and the fulcra for the objects explained.

DRILLING MACHINES—By Chas. W. Coe, of Ashtabula, Ohio: I claim, first, the peculiar manner of giving the slow automatic feed-motion to the spindle, and the fast receding motion, by means of the sliding pinion, collar, and screw, which is attached to the spindle, combined with the two sets of cogs, or their equivalents, upon the face of the same disc, the several parts above-named being constructed, arranged, and operating in the manner and for the purpose described.

Second, the peculiar method of constructing and arranging the clutch, by which the inclination of the clutch may be changed, as described, and the position of the clutch also moved or changed bodily in a horizontal direction.

HATS—By Francis Degen, of New York City: I am aware that metallic rings or bands have been used in helmets and similar articles, for the purpose of a support, but I do not know of any hat in which a strip of foil has been inserted between the leather or sweat and the hat; therefore, I claim the metallic strip or strips, inserted between the leather, or sweat, and the hat, and attached to either or both the hat or sweat, as described.

TONGUING AND GROOVING APPARATUS—By Phineas Emmons, of New York: I claim the shaft, connecting rods, cutter stocks, cutters, and slides, in combination with the stationary tonguers and groovers, for the purpose of tonguing and grooving boards, &c., as set forth.

HOT AIR FURNACES—By Stephen Gates, of Albion, N. Y.: I claim the combination of the deflecting plates, with the system of upright flues directly over the fire chamber, when such flues are arranged in the manner set forth, so that each flue of itself shall act as a deflector and insure a complete circulation through the whole system, substantially as described.

BENDING CARPET BAG FRAMES, ETC.—By E. L Gaylord, of Newark, N. J.: I claim the employment for the purpose of bending and forming carpet bag frames, or for bending two or more flat metal bars edgewise, for any purpose, of a pair of clamps, each moving independently of the other, in the direction of the width of the bars, and having recesses and self adjusting movable pieces, as described, combined in any way, substantially as set forth, with a table, and bending plate.

GRAIN AND GRASS HARVESTERS.—C. B. Brown, of Griggsville, Ill.: I claim the combination of the crown wheel, with the shafts, with their respective pulleys, acted upon alternately by the cogs of the wheel, the shafts being connected so as to turn in opposite directions, whereby a vibratory motion is given to the blade.

I do not claim either of these singly, but when combined, for the purposes and in the manner substantially as described.

GALVANIC BATTERY—By Louis Drescher, of New York City: I claim the improved arraagement of the old voltaic pile, the same consisting in so separating each galvanic pair from that next it, in the series, and connecting them with short wires, and forming the plates with suitable perforationt, as that the strips of leather or flannel, or their equivalent, may be at once saturated with the exciting liquid, by immersing the battery therein.

HINGE FOR MOULDER'S FLASKS—By Geo. Grant, of Troy, N. Y.: I claim a hinge for moulder's flasks, constructed substantially in the manner as described, by means of which the cope is raised in the jaws of the hinge, as set forth

CHAIRS—By J. T. Hammitt, of Philadelphia, Pa.: I claim operating the leg rest of the chair from the motion of the seat and back, by means of the lever and rod, or their equivalent.

MACHINES FOR HAT BODIES—By L. E. Hopkins, of N. Y City: I claim the feeding belts, constructed substantially as described, with jointed chairs, having cloth stretched between them, as set forth, by which their motion is exactly determined and equal.

Also the combination of the revolving endless planking board or table, with the feeding belts, both moving with the same velocity, for the purpose as described.

LOCK—By Richard Ketcham, of Seneca Castle, N. Y.: I claim the circular tumbler or its equivalent, in combination with the slotted collar, which encompasses the spindle of the knob, said collar and tumbler or its equivalent, being constructed and operating as described.

PADLOCK—By Rhodolphus Kinsley, of Springfield, Mass: I claim giving a forward motion to the hasp, and acting upon the tumblers by means of the same key, when the parts are arranged so that the key acts directly upon a portion of the hasp, substantially as described.

Secondly, the double acting spring described, only when used in connection with such a form and arrangement of hasp as will cause it to actuate the tumblers, and not only throw the hasp out, but hold it thrown out and fully open in the manner described.

MODE OF FROSTING GLASS—By John Levy & C. Jones, of New York City: We claim, first, frosting and figuring glass, by fixing the plates to be treated in a trough or vessel containing sand, pebbles, and water, and subjected to a short, quick, vibratory motion, in a longitudinal direction, by any suitable mechanical movement, thus causing the glass to pass through the mass of gritty material, before any considerable momentum is imparted to that mass.

Second, forming ornaments upon the glass by the application of patterns or designs, in connection with the process of frosting by the action of the sand and pebbles, as set forth.

WOODEN TYPE—By John McCreary, of Chesterville, Ohio: I claim the arrangement of the propelling lever, as that, by its return movement, in combination with the feeding lever, spring, dog, and feeding tube, it will move forward as required, the blank wood to receive the impression, as set forth.

PILL MAKING MACHINES—By E. H. Pond, of Rutland, Vt.: I claim, first, moulding or forming pills by means of two cylinders, having each a number of recesses in its periphery, the recesses in one cylinder matching with those in the other, and each matching pair forming a mould of the required form of the pill, the said cylinders revolving in opposite directions, and the pill mass being conducted between them, as described.

Second, the bands of india rubber, or any sufficiently elastic material passing round or partly round the mould cylinders for the purpose of expelling the pills from the recesses, after the moulds are open, substantially as set forth.

SHINGLE MACHINES—By Wm. Stoddard, of Lowell, Mass: I claim the combination of the rifting knife (connected with the main driver by means of elastic arms) with the inclined planes placed upon the rails, as described for the purpose of enabling the knife to be carried forwards under the block, during the forward movement of the said driver, and then be elevated to the proper height to split off a shingle, during its return movement, as set forth.

Also the arrangement of a secondary driver placed above and acting independently of the main driver, in such a manner that it will drive the rived shingle from under the block and deposit it upon the bed, in such position that it will be carried forwards to be dressed during the forward movement of the said dresser, substantially as set forth.

SCREW DRIVER—By J. W. Switzer, of Basil, Ohio: I claim the screw driver, spring catches, attached to the flat portions of the screw driver, and permitting longitudinal as well as lateral adjustment, and the barrel in which the whole is placed, in combination with the brace and stock, or their equivalents, the whole being constructed, arranged, and operating in the manner and for the purpose substantially as set forth

[See engraving of this invention in No. 6 of the present volume of the Sci. Am.]

REEL FOR HARVESTERS—By Warren W. & Clark C. Wright, of Canton, Pa.: We claim, first, extending the axle of the driving wheels, so far beyond the carriage as may be necessary to form a pivot for the reel to turn upon and allow of its rotation, by a band, as described, independent of the rotation of the axle, substantially as set forth.

SLAGS OF FURNACES—By Wm H Smith, of Philadelphia, Pa.: I claim the process of utilizing the slags of iron and other like furnaces, refining and working the same, substantially as set forth, whereby I bring into successful operation, for useful purposes, a class of hitherto useless products.

MACHINERY FOR MAKING WOOD SCREWS, ETC.—By Cullen Whipple of Providence, R. I (assignor to the New England Screw Company): I claim, first, the feeder, composed of a sectional trough, with a close bottom and open top, into which the blank drops and arranges itself before a traversing rod, which pushes it into the griping jaws, substantially as described.

Second, the combination of the traversing rod, actuated substantially as described, with an adjustable stop, for the purpose of setting the blank between the jaws in the exact position required, as set forth.

Third, the method of operating the jaws and holding them closed with the requisite force to hold the blank firmly between them, without end strain upon the mandrel, by means of toggle or knuckle joint levers, which are thrown slightly past centres, when the jaws are closed to hold them closed, when they are used in connection with elastic and long shanked nippers, substantially as described, whereby all end strain of the mandrel against its bearings is prevented, during and by the griping and holding of the blank.

Lastly, the spring discharging punch, constructed and arranged in such a manner that the same shall be compressed by the entrance of the blank between the griping jaws, and shall throw the blank out of the jaws, the instant they relax their hold of it sufficiently; such pushing out depending upon such relaxation and the force of the spring, and being entirely independent of the motion of any other part of the machine.

DESIGNS.

COOK STOVE—By Ezra Ripley & N. S. Vedder, of Troy, N. Y. (assignors to Samuel McClure, of Rochester, N. Y.)

NOTE—The applications for one-third of the list of patents given above were prepared at the "Scientific American Patent Agency." Besides the great amount of home business, we are securing a great number of patents in foreign countries.

Reform of the Patent Laws.—Patent Office and Patent Funds.

MR. EDITOR.—I was glad to see your timely recommendation of a reform of the patent laws, whereby the inventor and applicant for a patent would be put on an equal and just level with the Patent Office in the defence of his inalienable rights. I refer to cases of appeal. It is certainly anything but justice—much less republican policy—to make a rejected applicant for a patent pay the expenses of his appeal even when right and the Patent Office wrong. It would be no more than simple justice to alter our patent laws so as to make the Patent Office pay the stated expense of an appeal if its decision has been wrong, not as the law now is, by which the inventor has to pay the expense right or wrong—successful or unsuccessful.

President Filmore, in his message of Monday the 6th inst., recommends by the suggestion of the Secretary of the Interior that "provision be made for the publication and distribution periodically of an analytical digest of all the patents which have been or may hereafter be granted for useful inventions and discoveries with such descriptions and illustrations as may be necessary to present an intelligent view of their nature and operation. The cost of such a publication," says the message, "could easily be defrayed out of the patent fund, and I am persuaded that it could be applied to no object more acceptable to inventors and beneficial to the public at large."

This is very well in words; the French government does this, and that government also defends patents, so that a poor patentee, can have an able lawyer and an officer to pursue infringers. The great expense of lawsuits is the crying evil that poor patentees labor under. Why does not the President or the Secretary of the Interior recommend a reform in the Judiciary connected with patents? Is it because it would take away some of the lawyer's fees? The President is surely above this although a lawyer, by profession.

There is a surplus fund belonging to the Patent Office, and some people are continually on the look-out for such appropriations as may be beneficial to themselves. I trust that no one so interested has suggested from personal motives, such a plan as that proposed to the Secretary of the Interior; yet when it is taken into consideration that the Patent Office Report for 1851 is not yet printed, the recommendation made by the President is anything but well timed in accordance with the present and past practice of government publishing. I have been informed that the late Commissioner of Patents was an urgent advocate of the government publishing a digest of the patents, but he was favorable to a sum being granted by authority to the "Franklin Journal" for so doing. It is well known that attempts have been made (and glad I am they have all as yet been unsuccessful,) to get a grant from the patent fund, by some publishers of magazines. I hope that no movement of this kind is now going on "under the rose." JUNIUS REDIVIVUS.

Lecturing Noblemen.

A lecturing mania has invaded the ranks of the nobility of England. The Earl of Carlisle is announced to lecture on Gray, at Sheffield; the Duke of Newcastle is to lecture at Worksop; Sir Alexander Cockburn at Southampton, and Lord John Russell at Manchester. Nobility is looking up.—[Ex.

[This is no new thing, Lord Mahon delivered a most beautiful lecture four years ago to the mechanics of Leeds, and the Earl of Carlisle (formerly Lord Morpeth), has delivered some lectures every year to the mechanics in different parts of England. The conduct of these men confer dignity upon their position in society. No title but conduct can make a nobleman. The nobility of England at the present day present an amiable and commendable contrast to those of the last century.—Many of them are laboring to lift workingmen to their own positions in all that can make a man noble, viz., morality, intelligence and courtesy.

We have often been surprised at the want of taste or desire for good information, or want of spirit, we do not know which, manifested by our mechanics in the different large cities of our great country. They would not like to be called ignorant, or stigmatized for exhibiting a want of intelligence, nor would it be just to do so; for they are both spirited and intelligent, but we must blame them for not directing their attention to objects which have a most elevating tendency, and which confer honor and dignity upon men. We allude to useful public lectures by eminent men. We honor the young merchants of the City of New York, because they have the sagacity to perceive and the spirit to carry out the object of obtaining eminent lecturers every winter. Did they not engage the philosophic Nichol to deliver his splendid Astronomical Course, and this winter secure Thackeray, whose fame as an author is world-wide? The gentlemen of the Mercantile Association, with a sagacity which does them credit, understand how to make their Institution popular. The city of New York contains a population of 500,000; the city of Glasgow, Scotland, contains a population of about 365,000; both of them have Mechanics' Institutes; the latter is the oldest in the world, but at the same time the mechanics there do not possess the same means to maintain a good Institute as do those of our own city, but the following extract from the "Scottish Guardian" will show how that Institute is conducted:—

"The winter session, 1852–53 of this excellent institution is about to commence; classes on the following interesting subjects are already announced—viz., Chemistry, by Dr. Frederick Penny; Natural Philosophy, by Professor J. Scott; Popular Anatomy and Physiology, by Dr. Alexander Lindsay; Arithmetic and Mathematics, by Professor J. Scott; and Mechanical and Architectural Drawing, by Mr. Robert Harvey."

Can our mechanics not learn a lesson about rendering institutions devoted to their benefit popular and honored among the people?

Action Against the New Steamboat Law.

It is well known to our readers that a new law for steamboats was passed during the last session of Congress, which law was to take effect on the 1st of next month (January 1853.) We understand by the St. Louis Intelligencer that a petition is on foot in that city for the purpose of getting an extension of the time appointed for this law to go into operation.—The reason offered is, that little or no preparation has been made to meet the provisions of the law, in procuring the required life boats, extra safety valves, &c. One or two boats have made themselves ready to meet the legal demands, but the majority, it is stated, have not; hence quite a number of captains, pilots, and engineers have signed the petition. The real intention of the step is to procure the repeal of the statute.

Congress will no doubt treat the petition as it deserves; if it does not, and consents to act upon and give it countenance, then it will stain its character with a most reprehensable act. Since the law was enacted every steamboat company in our land has had sufficient time to prepare for and meet all its requirements.

The Cheap Postage Law.

By the Postmaster General's Report, we learn that the gross receipts of the Post Office Department for the last Fiscal year have been $6,925,971,28, from which $101,388,59 have to be subtracted as being due to Britain, which makes the real sum $6,824,582,69. The expenditures have been $8,745,771,20, leaving a deficit of $1,921,194,51, to be made up by special appropriation, which can easily be done, as we have a surplus revenue from other sources of $20,000,000. The receipts from all postages have been less by $1,431,696,54, than the past year under a higher postage. The reduction is owing to the decreased rates of postage under the new law. This diminution is greater than was anticipated by the Post Office Department, and greater than the friends of cheap postage expected, for it was hoped that there would be such an increase of correspondence as would make up for the reduced rates of postage. This was the case in respect to the penny postage law of Great Britain, and it was anticipated that the same results would be produced by our cheap postage law. No increase of postage, to make up the deficit is recommended; the report says, "all experience warrants the expectation that as the community becomes accustomed to cheap postage, written correspondence will increase." So think we; and as stamped envelopes will soon be ready for sale, no evasion of the law will take place by private correspondence—then letters with these envelopes can be carried by any person without being liable to damages for infraction of law. We hope that no person will ever be found evading the law for the future.

Packing Apples.

The following method is practiced in some parts of Maine for packing apples for shipment to California:—Each apple is wrapped in paper, and then placed in the barrel in layers. Between every two layers of apples is a layer of powdered charcoal. The apples are thus prevented from coming in contact with each other, and through the anti-putrescent qualities of the charcoal, the rot, even should it attack a part of the fruit, will be prevented from communicating to the remainder.

TO CORRESPONDENTS.

J. O., of Phila.—You can introduce your invention as early as you please; we shall have the papers prepared for you to execute very soon.

W. F. O., of Texas—Gum shellac dissolved in spirits of turpentine, in a close bottle, will make a cement admirably adapted to the purpose for which you require it. $10 received, which is correct for the number of subscribers you sent.

E. G., of Ohio—We have received the pamphlet, and will give the substance about the tunnel in our next.

T. H., of Pa.—In the hot-blast the oxygen does not combine with the hot iron of the pipes; if it did, how long would the pipes stand? There is a general mistaken idea that the oxygen of the atmosphere is continually combining with the iron of an exposed red-hot plate, if such were the case, how long would a plate stand before it was oxydized?

E. H., of Mass.—There is a work named "Humphrey's Photography;" also Hunt's, which latter contains full instructions. There is no way to obtain a good and complete knowledge of making philosophical instruments, except by model and reading the works that have been published on the same, which are very extensive in their range. We like your ideas, they are just and sound.

J. C. S., of N. Y.—We have been aware, for a long time, of a mill, driven by water, doing more work by night, in a given time, than during the day, and this information we have published before. Fires burn better during night than day. The article would be acceptable, you know the rule—short, clear, crisp, and sticking full of facts.

A. F., of Mass.—There is nothing new in the spiral bucket wheel you have described; they are old and well known.

W. S. T., of N. Y.—Neither of your plans are, in our judgment, practicable; aerial navigation is an airy scheme and requires a great stretch of the imagination to bring the mind up to even a reasonable hope of success; this has resulted from the failure of every plan to accomplish useful results; at present the system is fraught with much more pleasure than profit; we have no faith whatever in any plan yet proposed. The paddle wheels are old and well known.

W. J., of Ala.—We would allow 16 cubic feet per second for the 45 feet fall, and 15 cubic feet for the 50 feet fall; this is a little more (not quite a cubic foot) than by actual rule is allowed, and it makes allowance for the common deduction of one-third for loss; the rule for exact calculation is to multiply the power of wheel wanted, say 60 horse-power, by 33,000 (a horse-power), and divide this by your fall, fifty feet high, then divide by 62 1-2, to bring the pound to cubic feet in one minute, and by 60 for the cubic feet per second, and add one-third for the usual loss.

J. R. B., of N. Y.—The quantity or water being the same, we can see no difference in the two wheels (8 and 14 feet) except in the height of the fall—the ratio then is in proportion to this. The ratio of power, by this mode of estimating effect, will be the same by doubling the diameter of each wheel, but recollect that the power of the *water* is as the quanty and the fall; we cannot view the question in any other light.

A. N. Piper, of Athens. Geo., wants information about the price of a lathe for turning bobbins. Some of our readers may be able to inform him.

J. O., of N. Y.—Will you be pleased to send us a few more articles before we commence their publication. This will be the best way for us both.

J. K. L., of D. C.—We see nothing patentable in the sketches you have sent us. Whenever you correspond with this office again you must sign your name in full or no attention will be paid to your requests.

J. B. B., of Ark.—It is quite difficult to obtain in a single book a general knowledge of mechanism. We have sent you the "Hand Book of the Useful Arts," which we hope will please you.

R. G., of N. Y.—You are right about the steam engine; no person that we are aware of entertains a different opinion. The valves of steamboat engines are worked by inclined planes and by cams, so as to cut off suddenly. We cannot give you any information about those who are now applicants for patents. If you look on page 296, Vol. 4, Scientific American you will find a water-wheel that acts upon the same principle as yours, but not in the same manner.

W. J. McA., of N. Y.—We have not received the number, but have read it in another. We are aware of the truth of the criticism, and when you were removed we stigmatized the acceptance of the office as a mere trick.

G. W. S., of O.; W. H B., of N. Y.; E. B., of Miss.; G. H., of Texas, and N. B. D., of S. C.—We have obeyed your instructions in forwarding a stereotype plate of the Crystal Palace by the different routes designated by each.

Money received on account of Patent Office business for the week ending Saturday, Dec. 11:—

A. L., of N. J., $30; J. O., of Pa., $40; G. L. W., of Md., $30; N. C. T., of N. Y., $30; W. R. G., of N. Y., $30; C. & R., of N. Y., $40; G. N. L. D., of N. Y., $30; G. B. D., of Mass., $25; D. & B., of N. Y., $100; J. S. Van G., of Tenn., $30; J. C., of N. Y., $20.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Dec. 11:

T. A., of N. Y.; H. & McL., of Ga.; M. & E., of N Y.; C. & R., of N. Y.

A Chapter of Suggestions, &c.

PATENT LAWS, AND GUIDE TO INVENTORS.—We publish, and have for sale, the Patent Laws of the United States. The pamphlet contains not only the laws but all information touching the rules and regulation of the Patent Office. Price 12 1-2 cts. per copy.

FOREIGN SUBSCRIBERS—Our Canada and Nova Scotia patrons are solicited to compete with our citizens for the valuable prizes offered on the present Volume. [It is important that all who reside out of the States should remember to send fifty cents additional to the published rates for each yearly subscriber; that amount we are obliged to pre-pay on postage.]

PATENT CLAIMS—Persons desiring the claims of any invention which has been patented within fourteen years, can obtain a copy by addressing a letter to this office—stating the name of the patentee, and enclosing one dollar as fee for copying

SCIENTIFIC MUSEUM.

Safety Fluid Lamp---Chemical Cause of Explosions.

On our advertising page, will be found the advertisement of Mr. Newell's lamp, an invention which we have examined and which we estimate highly. It is a scientific lamp, and one which no one not acquainted with chemistry, could have invented; because the improvement is founded upon a knowledge of the gases; it embraces the principle of Humphrey Davy's invention of the Safety Lamp. In the centre of the lamp, extending to the bottom, is a fixed cylinder of fine tinned wire gauze, having a mesh of 500 to the inch. A tube of like gauze screws on to the wick disc, and confines the wick; this tube slips down inside of the gauze cylinder spoken of. The can for containing the camphene, or turpentine and alcoholic mixture, which is now commonly used for lamps, is made with a disc of this wire-gauze in the spout and under the lid. We have seen the fluid in the lamp set on fire by taking out the wick, and the fluid set on fire at the spout of the can, and no explosion take place. We have also seen the fluid poured into the lamp, out of the can, while the fluid in the spout and that in the lamp were blazing, and, instead of an explosion, the flame was extinguished. It may well be asked, —how can this simple application of wire-gauze prevent explosions in fluid lamps? The question is an important one. It was discovered by Humphrey Davy, that fine wire-gauze surrounding the flame of a lamp, would prevent the ignition of an explosive gas surrounding the lamp—but *why* it should do so men differ in opinion—the fact is known, and Mr. Newell has ingeniously applied his knowledge of the same. The reason why any gas is explosive, that is, goes off like gunpowder, by sudden expansion and contraction, when ignited, is owing to the combustible materials of its composition being fully saturated with oxygen, and it is then in a fit state to ignite instantaneously by the first spark. The gas we employ for lighting our streets, if it were saturated with oxygen, would, when a burner was opened and touched with a match, ignite quick as the lightning flash all the gas in in every pipe and gas-tank in our city, and would tear up our streets and blow up our houses as suddenly and forcibly as if they had been mined with gunpowder. This is the chemical cause of gas and other explosions, —viz., the combustible materials being fully saturated with oxygen and then ignited. The coals in our fires do not explode, because they are not saturated with oxygen, the supporter of combustion; the oxygen gradually combines with the carbon in combustion, but if our coals were reduced to a state of gas, and the gas mixed with twice its weight of oxygen, the mixed gas would ignite instantaneously when a match was applied, and cause what is termed an explosion—which is but instantaneous combustion; a fire is slow combustion, that is all the difference between the two. Those who keep volatile hydro-carbons, such as alcohol, turpentine, or mixtures of these two fluids in stores, &c., should be very careful and not suffer them to be acted upon by heat so as to cause evaporation and saturation with the oxygen of the atmosphere, which is simply—to use a solecism—a gunpowder gas.

Fossil Remains.

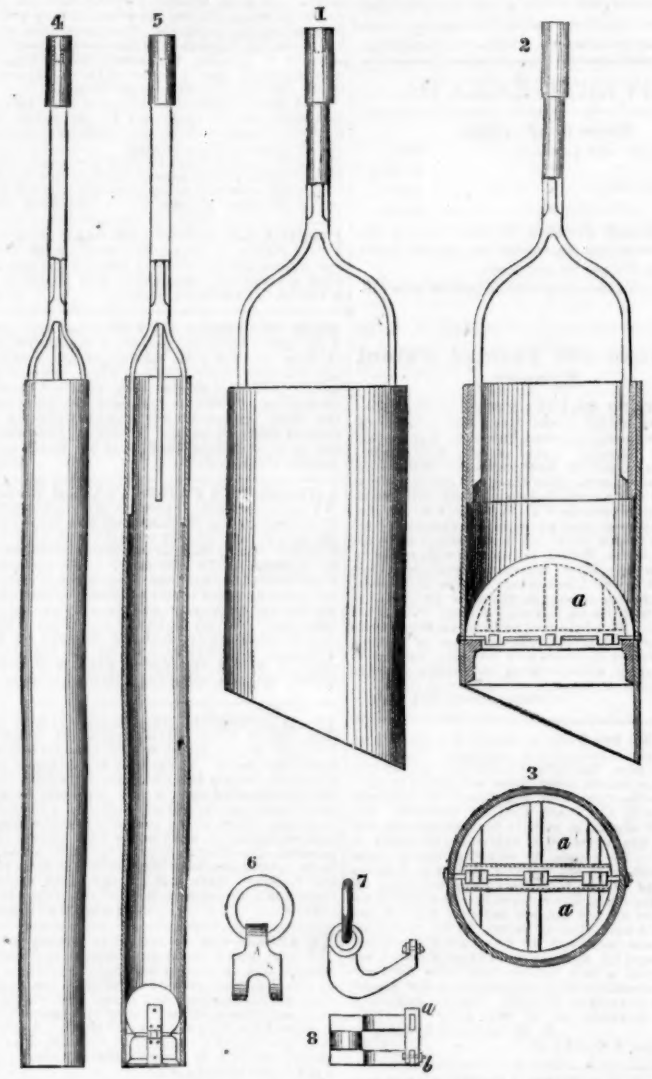
In the river bank of Zanesville, Ohio, a fossil elephant has been discovered, the third of the same species, in the same gravel bank within a few years past. It is in much better condition than the former two, and may, when completely exhumed, show almost the entire bones and frame of the huge monster, much beyond, perhaps, double the size of the living Asiatic or African elephant. The molar teeth, four in number, all that the species possess, were found in the jaws sound and unbroken, and two weigh twenty pounds each. The tusks were not in as good condition, one only being sound enough to bear moving.—This one eight feet in length, measures at its base, 26½ inches in circumference, and at the point eight feet distant, where it is broken off, 16½ inches in circumference, the whole length of which was probably 12 feet more.

Well Sinking---Artesian Wells.

(Continued from page 104)

Figures 1, 2, and 3 represent a large shell; *a a* are two valves opening upwards to admit the bored material; this tool is employed in boring through sand or hard ground after it has been loosened by other tools. Figs. 4 and 5 show a small shell similar in principle, but somewhat differing in detail, there being but one valve and the edges of the shell cut square, instead of slanting. Both of these tools are worked with a compound of circular and vertical motion. Figs. 6, 7 ,and 8 are dogs for suspendings the rods, to which are secured the boring tools. The latch, *a*, which opens on *b* as a hinge, allows the projecting knob of a rod to enter, and when shut secures the same in its clutches; the dogs can be suspended themselves by a rope.

Various theories have been advanced for springs, and lower strata of water. There can be no doubt but all water deposits, however deep, are obtained and furnished with water by percolation from above, derived from rains or melted snows. These descend through porous strata, and are received into rocky chambers in hills and mountains, or are retained in sands and gravelly seams, which have a firm rocky or a clay bottom, which prevents the water from passing down further. In many situations there are boiling springs—that is, water boiling out of the ground with considerable force. This is an evidence of a pressure exerted on the water somewhere; it must be by a column of water the head of which is above that of the spring. Have any boiling springs ever been discevered except beneath some elevations? We know of none. In very dry weather, springs which depend for a supply from a more elevated region, such as from neighboring hills, present unmistakeable evidence of their rainy origin, by oftentimes drying up. This is sure to be the result in moderately elevated situations—in extensive plains it is a standing fact.



In Egypt, the land of no rain, are there any wells in situations where the water does not overspread and percolate through the earthy strata during inundations; if there be, and no mountains near or distant, that could send down an underground supply, then the strongest argument that could be produced against rain being the great source of springs, is thus presented. We have no pointed and particular information to clear up such a question. In those parts of the American continent where no rains fall, nothing but dreary wastes spread out in barren desolation. An opinion was advanced by Descartes, that the sea was the cause of springs, not rains. He asserted that it found its way into the bowels of the earth, and there, by central heat, was converted into steam, which escaped upwards and was condensed into water in the cold upper strata, and in that state was collected in internal reservoirs in the mountains, hills, and depths of the earth. This idea of the cause of springs or fresh water being obtained in depths below the surface of the earth, has some plausibility to recommend it, but not a single experimental fact, so far as we are aware.

All wells which boil over the surface are Artesian in effect, whether bored or not; that is, the water is forced up by head pressure. In Williamsburgh, L. I., in the lowest part of the city, these flowing springs have been obtained by excavating a very inconsiderable distance. The supply, upon the principle set down, must depend upon percolation from a higher level, and as that elevation is built upon, and a great quantity of the water which falls is conducted into cisterns for domestic use, the supply for the springs below must decrease in proportion. The boring through strata by the tools and machinery represented, is merely for the purpose of giving vent, like a valve, to the water-pressure exerted from a high column of water somewhere through the earth, like an inverted syphon.

(To be continued.)

Gum Elastic.

It is said that not only flutes are made of India rubber, but canes, violins, and guitars! Indeed, by some new process the material is made so hard, that it is difficult to find tools with which to work it.

Oliver Routh, the second engineer of the steamer St. James, which blew up last July, killing Judge Preston and others, on Lake Ponchartrain, near New Orleans, has been indicted for manslaughter, a wonder truly.

LITERARY NOTICES.

GLEASON'S PICTORIAL DRAWING ROOM COMPANION—Since the commencement of this journal its character has greatly improved, both in the quality and quantity of the illustrations. Vol. IV. commences on the 1st of January, and the publisher guarantees great improvements, besides a reduction of the price. Up to this time the literary character of the Pictorial has not corresponded with the general excellence of its illustrations. It has been altogether too light, but hereafter this apparent defect will be remedied by the addition to the regular corps of contributors, of Ann S. Stephens, Mrs. Sigourney, Mrs. Neal, Misses Cary, Hastings Weld, H. W. Herbert, T. Buchanan Read, T. S. Arthur, Ben. Perley Poore, Dr. J. V. C. Smith, Park Benjamin, etc. With such able pens, assisted by the best artistic talent our country affords, there is nothing to prevent the Pictorial from taking a high rank among the standard publications of the day. We believe the publisher has abundant means to afford the subscribers a splendid paper. The following are the terms of the paper:—One subscriber, one year, $3; two subscribers, $5. The paper will be for sale at all the periodical depots throughout the country, after the 1st of January, at six cents per copy. S. French, Agent. Nassau street, corner of Spruce, New York.

THE CHILDREN OF LIGHT—By Caroline Chesebro, published by Redfield: New York.—We have been highly gratified with the perusal of this work, which is a fresh production from the pen of its talented authoress. Woman's heart is the theme, and none but a woman herself could have performed the task of ably depicting that enigma. The result has been a work of uncommon interest, full of noble sentiments and liberal ideas. Plighted vows and faithlessness in man, womanly pride, and womanly tenderness form the episode. The plot is simple, almost too much so for the generality of readers who, now-a-days, are not content with anything in the shape of a novel that is not one continual scene of excitement.

CAP SHEAF—By Lewis Myrtle: Redfield, New York—A collection of pretty unpretending tales that cannot fail to amuse its readers; they are written in a plain familiar style, which delights from its very simplicity. We are rejoiced at the appearance of such works, which are content with giving pleasure without forcing us to be always upon stilts, our modern writers are too apt to imagine that they are more entertaining as they become more obscure, and think if a feat of genius to lose themselves in a labyrinth of thoughts and expressions which it is impossible to understand. It will be enough to say that Lewis Myrtle is not one of this class of authors.

NATIONAL PORTRAIT GALLERY—Nos. 8 and 9 just received; they embrace portraits and comprehensive biographies of Timothy Dwight, Joel Barlow, John Trumbull, John Jay, John E. Howard, and Gilbert Stuart. This excellent work deserves the patronage of every person interested in the lives and character of America's dead and living great men. Price of each number 25 cents. R. E. Peterson & Co., Philadelphia; William Terry, 133 Nassau street, N. Y., agent

THE NEW ENGLANDER—No. iv. Vol. 10, of this Quarterly completes the present volume; it contains eight able articles on different subjects, not one of which could have been written by an inferior mind; it is published by F. W. Northrop, New Haven, Conn.

We are indebted to Messrs. Dexter & Bro. for the December numbers of Godey's Lady's Book and Arthur's Home Magazine; Godey has furnished a splendid number, full of fine embellishments.

Peterson's Magazine for December contains several spirited pictures and contributions of merit. For sale by Dewitt & Davenport, Tribune Buildings, New York.